flying, swimming, and sprouting up, are used as the signs for bird, fish, and plant.

Mr. Tylor is usually very cautious in concluding that any art or custom found among distant peoples has had a common origin, or can be used to measure the comparative antiquity of the migrations of races. Yet, in one case, in which he considers that it can be so used, he arrives at conclusions which hardly seem warranted by the facts. The Madagascans smelt iron, as do also the natives of Africa and of the western islands of the Malay Archipelago, but the bellows used in Madagascar is the peculiar Malay form—an upright bamboo, with piston formed of a bunch of feathers, and entirely different rom the inflated skin-bellows of Africa. This curious fact, taken in conjunction with many others, and with the presence of a considerable Malay element in the Malagasi language, as well as some physical resemblance between the Hovas and Malays, conclusively proves that there has been a Malay immigration to Madagascar, and also that it took place subsequent to the introduction of the art of working iron. So far the facts lead us safely; but Mr. Tylor, if we understand him rightly, goes further than this, and holds it to be proved that the art of smelting iron was first introduced from Malaisia rather than from Africa, and also that the Malay migration to Madagascar was a much later event than the Malay migration to Poynesia, where the use of iron was unknown till introduced by Europeans. Now, for all that the facts tell us, iron working may have been known in Madagascar before the Malays came, they merely introducing the bamboo bellows, which would be especially adapted to a country in which bamboos were abundant, but cattle, deer, and all large animals which could furnish suitable skins, *entirely absent*. They certainly might have introduced iron-working also, but the fact of their introducing a more useful form of bellows does not prove it. So, with regard to Polynesia, there are two sufficient reasons why iron-working should not have been introduced there, even if the Malay immigration had been long subsequent to that which invaded Madagascar. The only Malay iron-smelters are certain tribes of Borneo, Sumatra, and the Malay peninsula, while among the Javanese and Coast Malays who are the chief navigators, as well as among the whole of the Moluccan tribes, the art is entirely unknown. But the Malay element in the Polynesian languages is composed of pure Malay and Javanese words, and there is every reason to believe that wandering traders of these nations introduced the Malay language into Polynesia. Added to this the fact that the volcanic and coralline islands of the Pacific contain no iron ore, and we need not wonder at iron workers not being found among them, or that the tribes who still more recently peopled New Zealand should not know how to make use of the iron ore that occurs there. The evidence of language on the other hand would seem to be in favour of the Madagascar migration being the most ancient, because the Malay and Javanese words are generally more changed in the Malagasi than in the Polynesian languages. In the latter, scores of words are slightly modified but intelligible Malay, as *pua* for *bua* (fruit), *ika* for *ikan* (fish), while in the former many equally common words have been greatly altered, as *ravina* for *ron*, Jav. (leaf), *lanitra* for *langit* (sky); and the word *lima* or *rima* (five), which extends almost unchanged over the whole of Polynesia, becomes the hardly recognisable *dimi* in Malagasi. The Hovas are undoubtedly much nearer the true Malays in both physical and mental characteristics, than are the Maories or Tahitians, and this would indicate that a larger and more compact body had reached Madagascar than Polynesia. This is what we might expect, for the chances are so much against a safe canoe voyage across the open Indian Ocean, a distance of nearly 3,000 miles with scarcely an intervening island, that we can hardly suppose it to have occurred more than once; while the numerous islands in every part of the Pacific render it much more probable that canoes accidentally blown out of their course from the Moluccas or New Guinea, might repeatedly reach some islands tenanted by the Polynesian race. But a compact body which ultimately conquered much of the country and established a dominant race, would have a greater tendency to preserve their language unchanged; and the fact that so much change has taken place is an additional argument for the comparative antiquity of the Madagascar immigration. The ignorance of making pottery in Polynesia, an art which has certainly been known to the Malays and Javanese from a very early period, seems at first sight opposed to the theory of a late communication; but this fact may, I think, be easily understood when we consider that the immigrants were most probably traders, and of the male sex, and therefore ignorant of an art which in their native country is almost entirely practised by women. While treating of this subject, Mr. Tylor falls into some confusion by speaking of the "Malayo-Polynesian culture," and "the pure Malayo-Polynesian race," things which can have no existence, if, as I believe, Malays and Polynesians are almost as distinct as Malays and Africans.

The geographical distribution of customs, beliefs, and myths, furnishes our author with materials for some of his most curious and interesting chapters; but, still less than the arts of savage life, do they appear to afford any safe ground for conclusions as to the affinities or early migrations of the races of mankind. We cannot conclude without expressing our admiration of Mr. Tylor's industry and research in so little trodden and comparatively unproductive a field. He has carefully brought together a vast number of interesting phenomena illustrative of the mental condition of savage man, but we cannot help feeling that a satisfactory explanation of them has not yet been arrived at, and that we require researches of a very different nature before we can form any adequate conception of the various causes that have influenced the early mental development of the human race.

A. R. WALLACE

KARL KOCH ON TREE-CULTIVATION

Dendrologie: Bäume, Sträucher und Halbsträucher, welche in Mittel- und Nord-Europa im Freien kultivirt werden. By Prof. Karl Koch. 8vo. Vol. I. 735 pp., without illustrations. (Erlangen: F. Enke, 1869. London: Asher and Co.; Williams and Norgate.)

THE work of Prof. Karl Koch is a valuable addition to the literature of applied Botany; and no doubt throughout German-speaking countries it must early become the volume of all others most redolent of Nicotian essence on the shelves of people who concern themselves about tree-cultivation and general nursery-work. It has a considerable value, too, as a contribution to Scientific Botany, for its author has had long experience, with very favourable opportunities, in connection with everything woody,* hardy enough to bear exposure in the open air in Prussia. He is a good botanist and an enthusiast in his speciality, so that his book includes much useful information, especially of that kind, too seldom put on record, possessed by workers in the open air, or so scattered through periodical botanical and gardening literature, as to be hardly available at a pinch. To English botanists and nursery-folk it offers many interesting features. One amongst many others is the opportunity it affords of comparing the climatic differences between Britain and Central Europe, as deducible from the copious data which the "Dendrology" gives relating to the capacity of the various species to resist the severity of continental winters.

Here is an example of the author's plan of treatment. We take the common Aucuba, or so-called "variegated laurel," of every English shrubbery. *Aukuba*, not *Aucuba* Prof. Koch says it must stand :—

> *A. Japonica*, Thunb. Fl. Japon. 64, tab. 11 and 13 (1784).
>
> THE JAPANESE AUKUBA.
>
> Japan.
> Flowers in May and June.
> Leaves varying in form, mostly elliptical or elongate-lanceolate, usually sharply toothed above the lower third, glabrous : inflorescence with appressed hairs ; petals ovate-lanceolate, dark brown-red ; berries coral-red.
>
> One of the most beautiful of evergreen shrubs, unfortunately scarcely hardy in north-eastern Germany, even when protected in winter, though thriving in the open air in France and Rhine-land. In England it is a prime favourite.

Then follows a general account of the habit of the plant.

> Until quite recently we have had only the bright-yellow-spotted female shrub in our gardens, but since Von Siebold and Fortune have introduced the unspotted male plant, and a number of new forms, *Aukuba japonica* promises to compete with the Holly in variety. In the last catalogue (1867) of the Siebold-Garden, Witte has published no fewer than twenty-four forms as already in the trade.

Here are enumerated some of the more important of these, arranged according (1) to form of leaf, (2) kind or mode of variegation, and (3) toothing of the leaf-margin.

Altogether more than a page is devoted to this *Aucuba*. To its less-known Himalayan congener, *A. himalaica*, about half as much. The common Barberry extends over nearly five pages, but it is an extreme case of a variable and much-cultivated plant.

Throughout the plan is pretty much the same as is followed in *Aucuba*. After the name follows synonymy so far as may be needed; then frequently some explanation of the origin of the name, whether generic or specific, often including a biographical paragraph in the case of plants commemorating some person. Then follows the geographical distribution of the species. Here we may remark, what this book is especially apt to recall, the curious fact familiar to every botanist, how many well-known species of tree and shrub, even such as are not likely to have undergone material modification under culture, are of doubtful origin,—the horse-chestnut and walnut for example. Persia and the Central Asiatic plateau generally are credited with these trees, and probably the guess is in the right direction, though no wild specimens exist of either species in our herbaria.

There are some things we cannot agree with in the book, of course. For example, we should not undo *Cratægus*, and make all our thorns into medlars (*Mespilus*); nor do we consider the reasons given suffice to justify a renaming of our common lime-trees (*Tilia*); but these are matters too technical for discussion here, and after all of subordinate importance.

The first volume only, including the Polypetalous Natural Orders, is as yet published. Just at present German gardens are left pretty much to take care of themselves, and we fear there is no chance of the second volume until we have this miserable war settled. D. OLIVER

OUR BOOK SHELF

Travels of a Naturalist in Japan and Manchuria. By Arthur Adams, F.L.S., Staff-Surgeon R.N. (London : Hurst and Blackett, 1870.)

THOSE who wish to see what a world of pleasure may be opened up to one by an adequate knowledge of some department of Natural Science, ought to read this book. Mr. Adams is an enthusiastic naturalist, with a special "weakness," as he terms it, for insects, and the delight he has experienced in the hunt for specimens, and the close observation of his favourites in different parts of the world, have been simply endless. We should hope that some of his readers will find his eagerness "catching," and be led to feel new interest in objects which they have hitherto regarded with indifference, or perhaps treated as a nuisance. Among other animals observed by Mr. Adams with more or less care, was one of two specimens of the scaly ant-eater (*Manis Javanica*)—a female—which came under his notice. During the day she remained coiled up in a ball, but grew lively as night approached. In walking "she trod gingerly on the bent under-claws of her fore-feet, and more firmly on the palms of her hind-feet." One of her favourite attitudes was that of her gigantic extinct analogue, the Mylodon, as seen in the model of Waterhouse Hawkins in the gardens of the Crystal Palace. Supported on her hind limbs and "the firm, flattened, powerful, muscular tail," she would raise her fore-feet, moving her head and body from side to side, and peering cautiously about with her "little round prominent eyes." On the least alarm she tucked in her head between her fore legs. On one occasion she was coiled up in a strong net and supposed to be properly secured ; when night approached, however, she easily burst her trammels, and was discovered by the violent barking of a little dog who was puzzled and alarmed by the apparition of so strange a visitor. Both specimens were fed on raw eggs and chopped raw beef, and seemed to thrive. Besides observations of this sort, Mr. Adams's readers will find scattered throughout his work some pleasant sketches of natural scenery, a few descriptions of amusing personal adventures, and occasional glimpses into the different customs of the countries he has visited.

Echinides du Départemente de la Sarthe considérés au point de Vue zoologique et stratigraphique. Par MM. Cotteau et Triger. Avec 65 planches de fossiles, dessinées et lithographiées d'après nature par MM. Levasseur et Humbert, 10 planches de coupes géologiques, et 2 tableaux. Williams and Norgate, 1855—1869.)

NOTHING can afford better evidence of the zeal and assiduity with which palæontology is now pursued than the fact mentioned by M. Cotteau in the preface to this work, that whereas MM. Agassiz and Desor, in their

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* Down indeed to *Alyssum saxatile* and *Iberis saxatilis*.